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Modifying effects of carboxyl group on the interaction of recombinant S100A8/A9 complex with tyrosinase.

NematiNiko F[1], Cheqini KG[2], Asghari H[3], Amini A[4], Gheibi N[5].

Author information

1 Department of Nanotechnology, Islamic Azad University of Pharmaceutical Sciences Branch, Tehran, Iran.
2 Department of clinical Biochemistry and Genetics, School of Medicine, Qazvin University of Medical Sciences, Qazvin, Iran.
3 Department of Biotechnology, School of Paramedicine, Qazvin University of Medical Sciences, Qazvin, Iran.
4 Centre for Infrastructure Engineering, Western Sydney University, Bld Y, Locked Bag 1797, NSW 2751, Australia. Electronic address: a.amini@westernsydney.edu.au.
5 Cellular and Molecular Research Center, Qazvin University of Medical Sciences, Qazvin, P.O. Box: 34199-15315, Iran. Electronic address: ngheibi@qums.ac.ir.

Abstract

Tyrosinase is a determinant enzyme for modulating melanin production as its abnormal activity can result in an increased amount of melanin. Reduction of tyrosinase activity has been targeted for preventing and healing hyperpigmentation of skin, such as melanoma and age related spots. The aim of this systematic study is to investigate whether recombinant S100A8/A9 and its modified form reduce the activity of mushroom tyrosinase (MT) through changing its structure. Recombinant His-Tagged S100A8 and S100A9 are expressed in Escherichia coli BL21 (DE3) and modified using Woodward's reagent K which is a carboxyl group modifier. The structures of S100A8/A9 and its modified form are studied using fluorescence and circular dichroism spectroscopy, and the activity of MT is measured using UV-visible spectrophotometry in the presence of its substrate, L-3,4-dihydroxyphenylalanine (L-DOPA). The results show a lower stability of the modified protein when compared with its unmodified form. The interaction of S100A8/A9 with MT changes the structure and successfully reduces the activity of mushroom tyrosinase. Recombinant S100A8/A9 complex decreases MT activity which can control malignant melanoma, the most dangerous type of skin cancer.

KEYWORDS: Enzyme activity; Mushroom tyrosinase; Protein modification; S100A8/A9; Skin cancer

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